

ending the service call, which is an intelligent service call, in an ordered manner by the respective service upon an unsuccessful call set-up.

20. A method for implementing a call back service in a mobile radio network as claimed in claim 12, the method further comprising the steps of:

subscribing, by the subscriber, to a further intelligent network service;

sending, via the service control point, a connection set-up request to the second switching center; and

supplementing the connection set-up request by an identity of the further intelligent network service.

21. A method for implementing a call back service in a mobile radio network as claimed in claim 12, the method further comprising the step of:

suppressing, at the service control point, intelligent network dialogues produced with respect to the call originally received as a mobile terminated call.

22. A method for implementing a call back service in a mobile radio network as claimed in claim 20, the method further comprising the steps of:

requesting a connection set-up to the called party after the successful connection set-up to the calling party; and

supplementing a number originally dialed by an identity of the service control point responsible for the further intelligent network service.

REMARKS

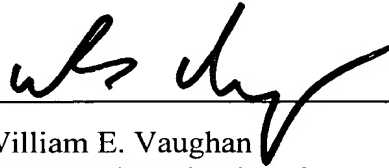
The present amendment makes editorial changes and corrects typographical errors in the specification, which includes the Abstract, in order to conform the specification to the requirements of United States Patent Practice. No new matter is added thereby. Attached hereto is a marked-up version of the changes made to the specification by the present amendment. The attached page is captioned **"Version With Markings To Show Changes Made"**.

In addition, the present amendment cancels original claims 1-11 in favor of new claims 12-22. Claims 12-22 have been presented solely because the revisions by red-lining and underlining which would have been necessary in claims 1-11 in

order to present those claims in accordance with preferred United States Patent Practice would have been too extensive, and thus would have been too burdensome. The present amendment is intended for clarification purposes only and not for substantial reasons related to patentability pursuant to 35 USC §§103, 102, 103 or 112. Indeed, the cancellation of claims 1-11 does not constitute an intent on the part of the Applicants to surrender any of the subject matter of claims 1-11.

Early consideration on the merits is respectfully requested.

Respectfully submitted,



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Abstract

ABSTRACT OF THE DISCLOSURE

~~Method for implementing a call back service in a mobile radio network~~

~~The~~ A USSD Call Back Service UCB ~~according to the invention which~~
provides a function ~~by means of~~ via which a telephone call MOC begun in a
foreign country is implemented by a call back service which then provides the
functions of:

- Analysis of an incoming USSD string,
- Analysis of A party and B party,
- Call set-up to the A party,
- Call set-up to the B party.

~~Figure 2~~

~~Figure 3~~

~~mit = with~~

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VERSIONS WITH MARKINGS TO SHOW CHANGES MADE**In The Specification:**

The Specification of the present application, including the Abstract, has been amended as follows:

SPECIFICATION**TITLE**

~~Method for implementing a call back service in a mobile radio network~~

METHOD FOR IMPLEMENTING A CALL BACK SERVICE IN A

MOBILE RADIO NETWORK

BACKGROUND OF THE INVENTION**Field of the Invention****Technical field of the invention**

Systems for mobile communication have increasingly gained in importance in recent years. Their spread is aided by the introduction of standards such as GSM (Global System for Mobile Communication) and, in the meantime, it has also become possible to communicate outside the borders of one's own country and network operator.

If a telephone call originates in a foreign country, the network operator of the visited public land mobile network (VPLMN) currently usually earns 70% of the fees paid by the network subscriber whereas the operator of the home public land mobile network (HPLMN) only receives 30%.

Prior Art**Description of the Prior Art**

The customer of telecommunication networks, ~~and especially the~~ particularly mobile radio networks, is already being offered a multiplicity of telecommunication services. To be able to offer new services rapidly and independently of manufacture and network operator, if possible, including the existing infrastructure, the concept of the Intelligent Network has been developed. A standardized concept which defines the IN architecture has been worked out in the ITU (see Standards Q.1200 ff).

In a further development, CAMEL (Customized Application for Mobile Network Enhanced Logic, see also GSM 02.78) was developed in which IN features were introduced into the GSM architecture. CAMEL simplifies roaming both internationally and between networks of different operators and creates a uniform protocol for accessing CAMEL servers in other GSM networks.

It is an object of the present invention, therefore, to specify a solution to the abovementioned problem in international or inter-provider roaming.

It is another object of the present invention to implement a call back service in a mobile radio network.

Description of the invention

SUMMARY OF THE INVENTION

~~This object is achieved by a method according to Claim 1.~~

~~The~~ Accordingly, the call back service for roaming mobile radio subscribers ~~according to~~ of the present invention allows PLMN operators to use the advantages of a call back service.

The call back service UCB (USSD (unstructured supplementary service data) Call Back Service) provides the desired functions:

- Analysis of an incoming USSD string,
- Analysis of A party and B party,
- Call set-up to the A party,
- Call set-up to the B party.

The IN service UCB is triggered ~~by means of~~ via a USSD string from the visited network VPLMN. If the roaming subscriber is not an IN (intelligent network) customer, the HLR (home location register) forwards the USSD string to a standard SCP which supports UCB; ~~if~~ If he is an IN customer, the correct service control point SCP address is located in the CAMEL Subscriber Information CSI.

Using a call back service, the ratio of fees can be reversed in favor of the HPLMN operator of the home network; ~~since~~ Since the call is set up by the HPLMN, the HPLMN operator now receives the greater proportion of the fees.

~~Advantageous embodiments and further developments are specified in the subclaims.~~

The interworking of the novel USSD Call back Service UCB with other IN services ~~will~~ also will be described. The special feature is that UCB enables roaming subscribers to telephone via IN even if the visited network (VPLMN) does not support the CAMEL protocol.

The UCB service is, thus, available to roaming IN customers who can use their subscribed service even without CAMEL. ~~I.e. That is,~~ roaming subscribers use CAMEL in VPLMNs which support CAMEL, and in countries without CAMEL support, the USSD solution is used.

Furthermore, non-IN customers ~~can~~ also can use UCB.

Another problem is interworking between a number of IN services in an SCP. This problem is solved by the IN service UCB cleverly setting the Called Party Address (CdPA) and Calling Party Address (CgPA).

Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Preferred Embodiments and the Drawings.

~~Brief description of the drawings~~

DESCRIPTION OF THE DRAWINGS

~~In the text which follows, the invention will be explained with reference to exemplary embodiments, in which:~~

Figure 1 shows the activation of the UCB service in the SCP;₂

Figure 2 shows how the call back connection according to the present invention is set up;₂ and

Figure 3 shows the interworking with a telecommunication network which does not support CAMEL.

~~Description of the preferred embodiments~~

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 shows how the call back service UCB is triggered by an incoming USSD (Unstructured Supplementary Service Data) string which is transmitted by

the roaming mobile radio subscriber via the mobile switching center MSC in the visited network VPLMN, A.

A USSD string is normally intended for the home location register HLR in which the subscriber is administered. Here, however, the "follow-me" (SR7) function available in Siemens HLRs is triggered ~~by means of~~ via the USSD string header. On the one hand, it expands the USSD string by the MSISDN (Mobile Subscriber ISDN Number) of the subscriber (A party) and then forwards it to a service control point SCP which supports the call back service UCB (B).

The SCP starts the IN service UCB. This service, in turn, returns to the A party a USSD string which acknowledges the receipt, C, D.

The IN service UCB first sets up a connection to the A party ~~by means of~~ via "Initiate Call Attempt" ICA, see Figure 2. Calling party CgPA is now the Called Party CdPA (B party) actually dialed and CdPA is the original CgPA (MSISDN of the A party); ~~at~~ At the same time, all Event Detection Points EDP are armed with RequestReportBCSMEvent RRB, 21, and then the procedure continues with "Continue" CUE.

According to the GSM standard, a gateway mobile switching center GMSC interrogates the home location register HLR of the subscriber with SendRoutingInformation SRI, 22, 23. The connection to the roaming party is set up via an IAM, 24. The service UBC receives via EventReportBCSM ERB the information whether the A party has answered (answer), is busy, is not answering (no_answer) or not available (not_reachable), 25.

In the case of the "answer", UCB responds with FurnishChargingInformation FCI so that an IN charges (AMA) ticket is written in the GMSC, and the operation "connect" CON which establishes the connection with the B party originally requested, 26.

In all other events (busy, no_answer, not_reachable), the IN dialog is ended in an ordered manner with "ReleaseCall" RL. Apart from "answer", it is not absolutely necessary to set the flags of the EDPs; ~~if~~ If, for example, the "not_reachable" flag is not set, the SCP does not find out about this event. The GMSC releases the call by itself and the SCP responds in the same way if it does not receive any information within a certain time.

Charging is ensured by the scenario: ~~using~~ Using "answer" by A, the GMSC generates a "roaming ticket" in which the answer time is entered. In the VMSC of the A party, an "MTC (mobile terminated cell) Ticket" is written and the SSP writes an "IN AMA (automatic message accounting) Ticket" due to the FCI (furnish charging information) operation.

Using "GetUserRecord", UCB decides whether and which IN service has been subscribed to by the A party. If the A party has no IN subscription, UCB acts as described above.

If the A party has an IN subscription, UCB expands the CgPA in the InitiateCallAttempt ICA by an administerable number of administerable numbers XXX which ~~can~~ also can contain hexadecimal digits (in Figure 3, the subscribed IN service prepaid service is shown by way of example), 1. The subsequent interrogation of the HLR, 2 and 3, possibly supplies a T-CSI.

Since the MTC IN dialog is not wanted - the roaming A party actually wants to transmit a mobile originated call (MOC) - it must either be suppressed ~~by means of~~ via SDDPFC or in the EntryFSL (flexible service logic) or MTC (Mobile Terminated Call) service logic on the basis of the XXX code in the CgPA, 4 and 5. The second interrogation of the home location register HLR (second step in the two-stage interrogation!) supplies the MSRN (mobile station roaming number) , 6 and 7, which provides for the connection to the A party, 8.

As soon as the A party answers, 9, the UCB is informed of this via ERB, 10. UCB then continues with the "Connect" operation CON which, as calling party CgPA, contains the MSISDN of the A party and, as called party CdPA, the number of the B party originally dialed, expanded by an administerable number of administerable numbers YYY (hexadecimal digits are possible), 11. Following YYY, a code point is to be set up at SSP which triggers the desired IN service at the "correct" SCP via an IDP (Initial Detection Point) (YYY must therefore be set up IN service-specifically).

Since the SCP has no information whatever about the A location of the A party, the service logic EntryFSL or the MOC IN service logic must determine the A location via the "AnyTimeInterrogation" ATI, 13. After that, the MOC service logic runs as if it had been started directly via a CAP (camel application part) :IDP.

In the case shown, PPS (prepaid service) continues with "ApplyCharging" AC and "Connect" CON B party.

If the A party is not available (busy, no_answer, not_reachable), the procedure described above ~~can~~ optionally can be adopted.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.

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List of abbreviations

| | |
|--------|---|
| AMA | Automatic Message Accounting |
| CAMEL | Customized Applications For Mobile Network- Enhanced Logic (GSM 02.78) |
| CAP | CAMEL Application Part |
| CdPA | Called Party |
| CgPA | Calling Party |
| CON | Connect |
| CSI | CAMEL Subscriber Information |
| CUE | Continue |
| EDP | Event Detection Point |
| FCI | Furnish Charging Information |
| FSL | Flexible Service Logic |
| GMSC | Gateway Mobile Services Switching Center |
| GSM | Global System for Mobile Communication |
| HLR | Home Location Register |
| HPLMN | Home Public Land Mobile Network |
| ICA | InitiateCallAttempt |
| IN | Intelligent Network |
| MOC | Mobile Originated Call |
| MSC | Mobile Switching Center |
| MSISDN | Mobile Subscriber ISDN Number |
| MSRN | Mobile Station Roaming Number |
| MTC | Mobile Terminated Call |
| PPS | Prepaid Service |
| SCP | Service Control Point |
| SRI | Send Routing Information |
| VPLMN | Visited Public Land Mobile Network |
| UCB | USSD Call Back Service |
| USSD | Unstructured Supplementary Service Data |